ANNEX F TO SMALLPOX RESPONSE PLAN 29 September 2002
DECONTAMINATION GUIDELINES.

REFERENCES.

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b. Department of the Army Pamphlet 385-69: Biological Defense Safety Program, 31 December 1993. http://www.usapa.army.mil/pdffiles/r385_69.pdf.

c. US Army MEDCOM Regulation 525-4, U.S. Army Medical Command Emergency Management, 11 December 2000. http://chppm-www.apgea.army.mil/smallpox/R525-4.pdf.

d. Army Field Manual 8-284, Navy Navmed P-5042, AFMAN (I) 44-156, MCRP 4-11.1C. Treatment of Biological Warfare Agent Casualties. Department of Defense, July 2000. www.adtdl.army.mil/cgi-bin/atdl.dll/fm/8-284/fm8-284.pdf.

e. USACHPPM Fact Sheet 59-005-1001: Blood-Borne Pathogens: Decontamination Procedures for Chemical Disinfectants, October 2001. http://chppm-www.apgea.army.mil/documents/FACT/59-005-1001.pdf.

f. Association for Professionals in Infection Control and Epidemiology (APIC). *APIC Text of Infection Control and Epidemiology*. Washington, DC: June 2000.

g. Joint Publication 4-06, Joint Tactics, Techniques, and Procedures for Mortuary Affairs in Joint Operations, 28 August 1996. http://www.dtic.mil/doctrine/jel/new_pubs/jp4_06.pdf.

h. Rutala WA, Weber DJ, Healthcare Infection Control Practices Advisory Committee (HICPAC). *Draft* Guideline for Disinfection and Sterilization in Healthcare Facilities February 2002. www.cdc.gov/ncidod/hip/dsguide.htm.

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m. Centers for Disease Control & Prevention. Guideline for Infection Control in Health Care Personnel, 1998. *Am J Infect Control* 1998;26:289-354. *Infect Control Hosp Epidemiol* 1998;19:407-63. www.cdc.gov/ncidod/hip/guide/infectcontrol98.pdf.

o. Title 29 Code of Federal Regulations, Section 1910.1200. Hazard Communication.

1. General. This annex augments and modifies CDC Guide F (reference a), based on current national infection-control and prevention guidelines (references b, c, d, e, f, and g). Appendix F-1 summarizes this annex on one page. Appendix F-2 (Decontamination Quick Reference Guide) summarizes the clinical, safety and occupational health requirements and guidelines for personnel conducting decontamination activities discussed in this protocol. Appendix F-3 provides a reference guide for patients housed in homes or temporary facilities. Appendix F-4 summarizes guidance on disinfecting environmental surfaces in healthcare facilities. Appendix F-5 provides definitions of technical terms used in this annex.

a. Mission. Health-care workers and the public will clean and disinfect areas potentially contaminated with smallpox virus or vaccinia virus, as well as properly dispose of hazardous and regulated medical waste (RMW) according to local, state, and federal regulations.

b. Definitions. Additional definitions appear in Appendix F-5.

(1) Decontamination. A procedure that removes pathogenic microorganisms from objects so they are safe to handle.

(2) Disinfection. Disinfection is the use of chemical reactions to eliminate virtually all recognized pathogenic microorganisms, but not necessarily all microbial forms (e.g., bacterial endospores) on inanimate objects. There are three levels of disinfection: high, intermediate, and low. High-level disinfection kills all organisms, except high levels of bacterial spores, by means of a chemical germicide cleared for marketing as a sterilant by the Food and Drug Administration (FDA). Intermediate-level disinfection kills mycobacteria, most viruses, and bacteria with a chemical germicide registered as a "tuberculocide" by the Environmental Protection Agency (EPA). Low-level disinfection kills some viruses and bacteria with a chemical germicide registered as a hospital disinfectant by the EPA.

(3) Cleaning. The removal, usually with detergent and water or enzymatic detergent and water, of adherent visible soil, blood, protein substances, and other debris from the surfaces, crevices, serrations, joints, and lumens of instruments,

devices, and equipment by a manual or mechanical process that prepares the items for safe handling and/or further decontamination.

c. Assumptions.

(1) Preparation. Personnel responsible for decontamination have been vaccinated against smallpox, trained in these procedures, and provided with appropriate safety measures and supplies, including personal protective equipment (PPE) (e.g., gowns, gloves, respirators, goggles).

(2) Ecology. Variola virus, if protected from ultraviolet light, may persist for as long as 24 hours, or somewhat longer under favorable conditions.

(3) Disinfection. Variola virus is easily killed by hospital-approved disinfectants (HAD) labeled as tuberculocidal. These disinfectants will be used in accordance with manufacturer's labeled instructions, including appropriate wet contact time.

d. Planning Factors.

(1) General Planning. Prompt recognition of a case of smallpox is integral to timely response, including decontamination. Education and training in the control of smallpox must occur before any smallpox outbreak occurs. Each facility must know its inventory of PPE for personnel involved in decontamination.

(2) Reusable Devices. Reusable devices and items that touch mucous membranes should, at a minimum, receive high-level disinfection between patients. These devices include reusable flexible endoscopes, endotracheal tubes, anesthesia breathing circuits, and respiratory therapy equipment. Sterilization is not required, except for critical items that will penetrate sterile body sites. In general, reusable medical devices or patient-care equipment that enter normally sterile tissue or the vascular system or through which blood flows should be sterilized before each use. Sterilization means the use of a physical or chemical procedure to destroy all microbial life, including highly resistant bacterial endospores. The major sterilizing agents used in hospitals are:

(a) Moist heat by steam autoclaving. Follow manufacturers' standard protocols for autoclave decontamination.

(b) Ethylene oxide. Place equipment to be decontaminated using this method in plastic bags permeable to gaseous ethylene oxide. Humidify the material to be sterilized by injecting water into the plastic-bagged material, to produce a relative humidity of 50% to 70%. Place the bags into an ethylene oxide sterilizer and allow an exposure of at least 24 hours at a concentration of at least 800 mg per liter ethylene oxide. Allow the equipment to fully aerate after ethylene oxide decontamination.

(c) Dry heat. Dry-heat sterilization relies solely on temperature without steam to achieve sterilization. Therefore, it usually requires higher temperatures (320-338°F or

160-170°C) and longer exposure times (2 to 4 hours). Dry heat is also less effective than wet heat for sterilizing biohazardous materials. A *Bacillus*-species biological indicator can verify dry heat sterilization.

e. Coordinating Instructions. Military Treatment Facility (MTF) infection-control officer(s) coordinate and oversee infection prevention and control measures with healthcare providers, nursing staff, housekeeping, logistics, central material supply, and other MTF sections. The infection control officer may be required to brief the MTF command group and others on proper infection prevention and control measures within the MTF.

2. Execution.

a. Concept of Operations. Recognition of a single patient with smallpox constitutes an international public-health emergency. The control of disease is primarily a public-health strategy of rapid identification and immediate isolation of cases, with immediate vaccination of all significant contacts and healthcare providers. Patients should be hospitalized, if adequate Airborne Infectious Isolation Room (AIIR) facilities permit. Adequate infection-control procedures will be paramount to preventing further spread.

b. Key Personnel.

(1) Team leader – senior military medical officer.

(2) Infection-Control Professional/Officer – Preventive medicine, public health, epidemiologist, infection-control officer.

(3) Public health officer, environmental health officer, or bioenvironmental engineer.

(4) Surgical-supply and central-supply officer.

(5) Nursing personnel – corresponding to acuity of care needed.

(6) Public-health officer – senior community health nurse or epidemiologist.

(7) Housekeeping staff – proportionate to need.

(8) Industrial hygiene officer

c. Tasks and Responsibilities.

(1) Vaccination. Healthcare personnel and ancillary personnel subject to this document need smallpox vaccination. Vaccinations will be provided as described in Annex B. Medical follow-up to vaccine recipients will be provided by the occupational-health service, with support from infectious-disease, dermatology, and/or allergy-

immunology services for complications after vaccination. Active-duty military will report to sick call for any adverse events. Civilians and contractors experiencing an adverse event will report to the emergency department, occupational-health clinic, or other designated location.

(2) Respiratory Protection. Direct-care providers and ancillary staff will be entered in the respiratory protection program and wear a fit-tested NIOSH-approved N95 particulate respirator, eye protection if there is potential for splashing, gown, and gloves whenever patients having known or suspected smallpox are treated or housed within the MTF:

(3) Occupational Safety. Safety manager/facility manager, industrial-hygiene staff, and infection-control officer will assist supervisors in:

(a) Verifying applicable engineering controls (e.g., ventilation systems for Airborne Infection Isolation Rooms) are operational.

(b) Repairing nonfunctional engineering controls through facilities management.

(c) Ensuring personnel have adequate supplies of appropriate PPE.

(d) Verifying effectiveness of safe-work practices.

(e) Verifying that healthcare providers and staff required to wear respiratory protection participate in the MTF's respiratory protection program.

(f) Investigating engineering controls, administrative controls, work practices, PPE, when notified of known or suspected cases of smallpox.

(g) Providing safety education and training on infection-control procedures for smallpox.

(h) Establishing and implementing procedures for safe handling of contaminated clothing and linen, including outside work with contractors, if applicable.

(i) Identifying additional rooms in the MTF that can be used as isolation areas, if the number of patients to be isolated exceeds the capacity of existing Airborne Infection Isolation Rooms. Consider floors or wings of MTFs where patients can be isolated, or separate facilities (e.g., gymnasiums).

(4) Nursing staff will:

(a) Monitor and document proper negative airflow in Airborne Infection Isolation Rooms in use daily.

(b) Participate in the MTF's respiratory protection program.

(c) Adhere to standard precautions: Wash hands after patient contact with antimicrobial soap. Alcohol-based hand-hygiene agents may also be used. Wear gloves when touching blood, body fluids, secretions, excretions, or splashes of blood, body fluids, secretions or excretions. Handle used patient-care equipment and linen in a manner that prevents the transfer of microbes to people or equipment. Refer to MTF infection control manual. Use care when handling sharp objects and use a one-way valve mouthpiece or other ventilation device as an alternative to mouth-to-mouth resuscitation, when practical.

(d) In addition to standard precautions, adhere to airborne precautions: Place the patient in a private room with monitored negative air pressure, a minimum of six air changes per hour, and appropriate filtration of air before it exits the room. Cohorting (grouping like patients together) may be necessary if the number of patients exceeds available isolation rooms, and will need to be considered in the facilities' plans. (APIC's *Bioterrorism Readiness Plan: A Template for Healthcare Facilities* discusses this issue). Wear a fit-tested NIOSH-approved N95 particulate respirator when entering the room. Limit movement and transport of the patient to medically essential tests. Place surgical masks on smallpox patients, if they need to be moved.

(e) In addition to standard precautions, adhere to contact precautions: Place the patient in a private room, or cohort multiple patients with the same infection, if possible. Wear gloves when entering the room. Change gloves after contact with infective material. Wear a gown and fluid-resistant gown when entering the room. The smallpox lesions, drainage, and scabs are infective. Thorough hand washing and/or hand disinfection is required before entering and when exiting the room. Limit the movement or transport of the patient from the room. Ensure that patient-care items, bedside equipment, and frequently touched surfaces receive daily cleaning. Dedicate use of non-critical patient-care equipment (e.g., stethoscopes) to a single patient or cohort of patients with the same pathogen. If not feasible, adequately disinfect the equipment between patients.

(f) Limit access to the least number of people required for patient care or room maintenance.

(g) Report accidents, injuries, and other possible sources of exposures to supervisor and safety and/or occupational health services.

(5) Occupational-health / public-health staff will:

(a) Develop protocols for handling work-related infections and monitor staff health and report cases of known or suspected smallpox to safety/infection-control/public-health staff, as appropriate.

(b) Maintain employee medical records, as appropriate.

(c) Work in concert with immunization personnel to formulate written protocol for providing immunizations, according to Annex B.

(d) Respond to adverse events reported after vaccination.

(e) Ensure appropriate referrals to infectious-disease staff.

(f) Complete documentation.

(g) Assist with the respiratory protection program, including medical evaluations for clearance, and record-keeping.

(6) The MTF will provide training on workplace hazards and the emergency preparedness plan and ensure employee attendance. Training will meet the CDC and HICPAC Guidelines for Infection Control in Healthcare Personnel, including the availability and use of PPE.

(a) Educational materials need to be readily available, including fact sheets specific for health care workers, families, worried well, and patients.

(b) Provide educational materials and training for people with special needs, such as people with low English literacy. Ensure employee, patient, family education sheets are available in the primary languages of the given population.

(c) Make policies and procedures available electronically and on paper.

(d) MTFs will ensure adequate supplies of standard precaution and transmission-based precaution instructional signs (e.g., airborne-isolation signs, contact-isolation signs).

3. Administration and Logistics.

a. Linen & Waste Management. MTFs will develop plans for handling linens and regulated medical waste (RMW), as well as ensuring adequate medical supplies. All waste generated by smallpox patients will be treated as RMW. Linen may be handled through normal in-house or contract mechanisms as long as provisions have been made for the appropriate protection of the personnel who will be handling the linen (i.e. vaccination and appropriate personal protective equipment).

b. Sources of Supply. MTFs will identify Prime Vendor (PV) capabilities for increased deliveries of all medical supplies and equipment. MTFs will develop contingency plans for requisitioning medical supplies, in case standard channels are inadequate. Just-in-time delivery by prime vendors may not be sufficient to meet needs during outbreaks, based on the large volume of supplies that may be needed throughout a region. Establish delivery protocols for delivery of key supplies and equipment.

c. Transport of Regulated Medical Waste. Logistics or housekeeping division will be responsible for collecting, packaging, and disposing of RMW according to local, state, and federal regulations, as well as maintaining required documentation (manifests). The environmental science officer or preventive-medicine staff provides guidance as needed. Facilities that perform regulated medical waste handling on site will ensure appropriate coordination with local and state officials.

4. Cleaning, Disinfecting, and Sterilization of Equipment and Environment.

a. A component of contact precautions is careful management of potentially contaminated equipment and environmental surfaces.

b. When possible, dedicate non-critical patient-care equipment to a single patient (or cohort of patients with the same illness), or use disposable items and discard them after each use.

c. If sharing non-critical patient care equipment is unavoidable, do not use potentially contaminated equipment for the care of another patient, until it has been appropriately cleaned and disinfected. Monitor actual practices for policy compliance.

d. HAD disinfectants easily kill variola and vaccinia viruses.

e. Each MTF will develop and implement written schedules and methods for cleaning and decontaminating environmental surfaces, work surfaces, equipment, and instruments to meet the needs of the area. If contract housekeeping services are used, review these instructions for accuracy in the cleaning of isolation rooms. Considerations include:

(1) Location within the facility (e.g., surgical operatory, patient room, biomedical maintenance equipment repair).

(2) Type of surface to be cleaned (e.g., hard-surfaced flooring, carpeting).

(3) Type of soil or spilled infectious material present (e.g., gross contamination. versus spattering, blood versus urine).

(4) Tasks or procedures being performed in the area (e.g., laboratory analyses, normal patient care)

(5) Base MTF policies and procedures for housekeeping on the recommendations found in Appendix F-4.

f. Patient-Transport Vehicles (e.g., ambulances). Remove unnecessary items from ambulances to avoid contamination and facilitate decontamination. Vaccinate patient transport personnel before transport or within 24 hours. Equip ambulance with appropriate supplies (e.g., N95 respirators (if fit-tested), disposable gloves, gowns, shoe

covers, biohazard bags). Decontaminate ambulance before reuse to transport patients not infected with smallpox, focusing on the passenger compartment and all door handles.

(1) All items that can be incinerated or autoclaved should be bagged and processed by one of these methods.

(2) Sterilize heat-sensitive, reusable items using ethylene oxide as outlined above.

(3) Decontaminate large items (e.g., stretcher) at the same time as the ambulance.

(4) Spray the entire interior of the ambulance heavily (until the solution runs off) with HAD. Personnel performing this step should wear respiratory protection.

(5) Allow the solution to stand on all surfaces per manufacturer's recommendations (e.g., 20 minutes).

(6) Wet vacuum or wet clean with clean cloths, disposable wipes, or mops with disposable mop heads, all surfaces inside the ambulance and all outside door handles

(7) Vacuum cleaner contents, cloths or disposable wipes, mop heads, and protective clothing worn by the decontamination personnel should be bagged and incinerated, autoclaved, or laundered as outlined above.

(8) Disinfect the vacuum cleaner with HAD after use.

g. Private Vehicles. The procedures above may not be possible for private vehicles used to transport smallpox patients. At a minimum, perform the following decontamination procedures:

(1) Bag and incinerate all disposable items in the vehicle.

(2) Thoroughly wipe down all surfaces in the vehicle with HAD. Allow the solution to remain on the surfaces for at least 20 minutes before being removed.

(3) Clean carpets and upholstery using HAD. Allow the solution to remain on the carpets and upholstery for at least 20 minutes before being wiped off. Allow cloth upholstery to completely dry before use.

(4) Thoroughly clean all outside door handles using HAD. Allow the solution to remain on the door handles for at least 20 minutes before being wiped off.

(5) Launder cloth material used to wipe down the inside of the vehicle using hot water (71ºC) and bleach or bagged and incinerated (see above).

h. Buildings. Historically, decontamination of whole buildings or parts of buildings has been advocated, using formaldehyde or amphyl fogger methods. These procedures are controversial due to the toxicity and carcinogenicity of the chemicals used. DoD does not advocate these methods, because variola virus is easily killed by hospital-approved disinfectants and because vaccinia virus (as a surrogate for variola) is inactivated by ultraviolet light. Variola can persist for longer times within a scab matrix than in air. Following procedures recommended in this annex (e.g., terminal cleaning of rooms with HAD; cleaning, decontamination, and disinfection of environmental surfaces, equipment, laundry, vehicles), will thoroughly decontaminate a facility.

5. Special Situations. The Joint Service Sensitive Equipment Decontamination (JSSED) system(s) will eventually provide the ability to decontaminate chemical and biological agents from sensitive equipment (e.g., avionics, electronics, electrical, and environmental systems and equipment), aircraft/vehicle interiors (during flight/ground/shipboard operations), and associated cargo. These systems are still in development.

6. General Guidelines.

a. Environmental Surfaces.

(1) Disinfectants/detergents. Use EPA-registered disinfectants/detergents for routine decontamination. Disinfectants used for standard hospital infection control, such as hypochlorite, phenolics, and quaternary ammonia, are effective for cleaning surfaces possibly contaminated with smallpox. The product selected by the institution is referred to in this document as the hospital-approved disinfectant (HAD).

(2) Scheduled tasks for a minimum cleaning schedule for isolation rooms include.

(a) Daily high dusting (i.e., above eye level; e.g., light fixtures) with chemically treated dust cloth or mop designed to prevent dust dispersal.

(b) Daily spot cleaning of walls, windows, doors, and door handles, as needed.

(c) Daily wiping of horizontal surfaces with a clean cloth dampened with HAD.

(d) Daily, disinfect cleaning equipment (e.g., water, bucket, cleaning cloths, mop heads) before use on another room.

(e) Upon Discharge. Thorough cleaning of walls, windows, doors, and door handles, plus patient equipment (e.g., monitors, IV pumps & poles, sphygmomanometer).

(3) Formaldehyde and Amphyl fogger decontamination methods are no longer recommended.

b. Patient-Care Equipment and Instruments.

(1) Critical devices (those that enter sterile tissue or the vascular system) require sterilization with FDA-registered sterilant or disinfectant. Follow the normal facility disinfection process.

(2) Semi-critical devices that touch mucous membranes, depending on type of device, require minimally high-level disinfection with an HAD disinfectant. Follow the normal facility disinfection process.

(3) Non-critical devices that touch intact skin require low-level disinfection with HAD. Follow the normal facility disinfection process.

c. Soiled Linen. Transmission of smallpox virus via contaminated bedding is documented in historical literature. Modern methods of linen management and infection control are sufficient to minimize the risk of infection transmission. The use of linen chutes is not recommended. An on–site laundry service is preferred.

(1) Linen service staff must:

(a)-Receive smallpox vaccine within previous 3 to 10 years and be trained appropriately to their risk and educational level of understanding.

(b) Wear fit-tested NIOSH-approved N95 particulate respirator and fluid-resistant gowns and gloves when handling or sorting soiled linens.

(c) Use quality-assurance monitoring tool and evaluator to validate linen process.

(2) Place covered linen hampers lined with impervious laundry bags just inside the door of an isolation room.

(a) Place only cloth items (not yellow paper gowns) in the hampers.

(b) Wrap linen soiled with blood or other body fluids in sheets or placed in a pillowcase to prevent dripping prior to placing in the linen hamper.

(c) Do not fill laundry bags more than two-thirds full and remove at least every 24 hours. Bag with minimum agitation at site of use. Follow MTF guidelines for identification of isolation linen.

(3) Laundering Procedures.

(a) Do not sort contaminated linens before washing, to minimize the exposure to personnel and to decrease the aerosolization of contaminated particles.

(b) Wash items with a detergent in hot water (71ºC, 160ºF) for at least 25 minutes.

(c) Bleach cycle achieves 50 to 150 parts per million (ppm).

(d) Add mild acid to neutralize any alkalinity in the water, soap, or detergent.

(e) Check dryer temperature. Clothes must be dried completely in a commercial dryer (not line dried).

d. Regulated Medical Waste. NOTE: Abide by whichever regulations are most stringent in your area: federal, state, or local.

(1) Dispose of all bodily fluids safely via the sanitary sewer, following routine protocols.

(2) Discharge Management. In general, patients with smallpox will not be discharged from a healthcare facility until no longer infectious or sent to another designated facility. Therefore, no special discharge instructions are required. However, patients who do not need specialized care may be discharged to their homes (but not barracks or dormitories) while infectious, because of lack of space in the MTF. MTFs will provide instructions for infection control to be observed by patients in their home (e.g., Appendix F-3).

e. Post-Mortem Care. Use airborne and contact precautions for post-mortem care. Cremation is preferable to burial for the remains of smallpox victims. The National Association of Medical Examiners (NAME) determined that embalming cadavers presents an infectious risk to the embalmer. Double-bag the bodies and decontaminate the outside of the outermost bag with a 1:10 bleach solution. Transfer bodies in hermetically sealed containers. As provided in Joint Publication 4-06: Remains suspected of biological contamination must be placed in two human-remains pouches and marked "BIOLOGICAL [BIO]" before to evacuation to a Mortuary Affairs Decontamination Collection Point (MADCP). These remains must be kept separate from other remains during the processing and while awaiting transportation. Mark the top of all case file forms "BIO."

APPENDIX F-1
Decontamination Guidelines – Summary.

1. Variola and vaccinia viruses, if protected from ultraviolet light, may persist for as long as 24 hours, or somewhat longer under favorable conditions. Variola and vaccinia viruses are easily killed by hospital-approved disinfectants (HAD) labeled tuberculocidal.

2. Decontamination removes foreign material, preceding disinfection or sterilization. People responsible for decontamination need several layers of personal protection: vaccination against smallpox, training, and personal protective equipment (PPE).

3. Disinfection uses chemical reactions to eliminate recognized pathogenic microbes, but not necessarily all microbial forms (e.g., bacterial spores) on inanimate objects. There are three levels of disinfection: high, intermediate, and low. High-level disinfection kills all organisms, except high levels of bacterial spores, by means of a chemical germicide recognized as a sterilant by the FDA. Intermediate-level disinfection kills mycobacteria, most viruses, and bacteria with a chemical germicide registered as a "tuberculocide" by the EPA. Use these disinfectants according to labeled instructions, including appropriate wet contact time.

4. Reusable devices and items that touch mucous membranes should receive at least high-level disinfection between patients. Sterilization is not required, except for critical items that will penetrate sterile body sites. Sterilization is a physical or chemical procedure to destroy all microbial life, including highly resistant bacterial endospores.

5. MTFs will develop plans for handling regulated medical waste (RMW). All waste generated by smallpox patients will be treated as RMW. Dispose of all bodily fluids safely via the sanitary sewer.

6. Bag soiled linen with minimum agitation at point of use. Do not sort linen prior to the completion of the wash and dry cycles. Explain procedures to contract laundry services.

7. When possible, dedicate non-critical equipment to a single patient (or cohort of patients with the same illness). If use of common items is unavoidable, do not use potentially contaminated, reusable equipment for the care of another patient, until it has been appropriately cleaned and reprocessed.

8. Post-mortem care. Use standard, airborne, and contact precautions for post-mortem care. Cremation is preferable to burial. The National Association of Medical Examiners (NAME) determined that embalming cadavers presents too great an infectious risk to the embalmer. Generally, double-bag bodies with superficial decontamination of the outside of the bag. Transfer bodies in hermetically sealed containers.

9. Appendix F-2 summarizes decontamination and infection-control procedures. Appendix F-3 summarizes home care and vehicle procedures.

APPENDIX F-2
Decontamination & Infection Control Reference Guide.

Isolation Requirements - Strict Adherence is Mandatory
Standard Precautions for all aspects of patient care - Strictly enforced.
Contact Precautions - Place sign on the door. - Fluid-resistant gown and gloves to enter the room. - Disposable gowns - treat as regulated medical waste (RMW). - Cloth gowns placed in leak-proof laundry bags. - Respirator/eye shield/face shield during procedures prone to splashing, spraying.
Airborne Precautions - Must be in negative airflow room - Place sign on the door.
Fit-tested, NIOSH-approved, **N95** particulate respirator by **anyone** entering room. - Must be in Respiratory Protection Program.
Alcohol-based hand-hygiene agent before entering room and on exit.
Wash hands with antimicrobial soap.
Monitor staff entrance and exit.
Serve food in disposable service ware - If large scale outbreak, ensure dietary staff are trained to wear gloves when handling dishes from isolation room and ensure compliance with water temperatures and detergents.
Cleaning & Disinfection of Equipment
Thorough terminal cleaning of room with hospital-approved disinfectant (HAD). *
Alternative is to also disinfect surfaces with solution containing 1 part bleach and 9 parts of water (10% solution) Store bleach in an opaque bottle. Label accurately.
Dedicated equipment - disinfect if reusable or discard as RMW if single-patient use, when patient discharged.
Thermometers - may use glass thermometers or strip type.
Stethoscope, BP cuff and sphygmomanometers - Dedicated or disposable.
Place linen hamper in the room. See linen management below.
Treat non-regulated medical waste the same as RMW.
RMW handled per MTF policy.
Housekeeping
Trash container emptied and disinfected.
Low dusting and cleaning all exposed surfaces with HAD. *
Patient's bed cleaned and free of soiling & foreign matter.
Fixtures, walls, lights, doorknobs, bedrails, and overbed tables cleaned and free of fingerprints/hand marks with HAD. *
Floor damp-mopped using two bucket method using HAD. *
Vents, grills, windowsills and blinds damp wiped with HAD. *
Sink and toilet bowl disinfected.
Cotton mop changed after each room and placed into plastic bag for laundering.
Mopping water changed after each room.
Must wear PPE – fit-tested NIOSH-approved N-95 particulate respirator, fluid-resistant gown and gloves.

Linen Management
An on–site laundry service is preferred.
Linen service staff must be vaccinated against smallpox (within previous 3 to 10 years) and trained appropriately to their risk and educational level of understanding.
The use of linen chutes is not recommended.
Staff must wear fit-tested NIOSH-approved N95 particulate respirator and fluid-resistant gowns and gloves when handling or sorting soiled linens.
Use quality-assurance monitoring tool.
Reusable cloth protective clothing and soiled linens may be transported to the laundry following MTF guidelines for identifying isolation linen.
Place linens in leak-proof bags, following MTF guidelines for identifying isolation linen.
Contaminated clothing and linens should be not sorted prior to washing to minimize the exposure to personnel and to decrease the aerosolization of contaminated particles.
Hot water washing: Wash items with a detergent in hot water (71ºC, 160ºF) for at least 25 minutes. Bleach cycle achieves 50 to 150 ppm. Add mild acid to neutralize any alkalinity in the water, soap, or detergent. Check dryer temperature.
Clothes must be dried completely in a commercial dryer (not line dried).
Transportation of Linens and RMW Off site
All personnel involved in handling, transportation, and disposal of medical waste from facilities where confirmed or potential smallpox patients are housed must have **recent** vaccination against smallpox (within 3 to 10 years).
Contaminated linen and RMW must be transported in accordance with local, state, and federal regulations.
Reusable Medical Equipment
Decontaminate reusable medical equipment using soap and water or the appropriate instrument detergent or enzymatic cleaner, in accordance with manufacturer's instruction.
Critical instruments that require sterilization – Manufacturers' standard protocols for autoclave use – steam sterilization, gas/plasma; paracetic acid and ethylene oxide.
Semi-critical items – High-level disinfection practices per the institution's policies.
Non-critical – After cleaning, these items may be wiped down with HAD.
Quality-assurance monitoring of disinfection and sterilization processes per routine procedures.
Post-Mortem Care
Follow principles of standard precautions.
Airborne precautions.
- Fit-tested NIOSH-approved **N95** particulate respirator used by **anyone** entering room.
- Negative-pressure rooms.
Contact precautions.
Thorough terminal cleaning of room with HAD* following autopsy or a fresh solution of 1 part bleach and 9 parts water (10% solution).
Burial / Storage Issues
Cremation is preferred over burial.
HAD: **Hospital-approved disinfectant (HAD) -Tuberculocidal - must be EPA registered. HAD is mixed, used, and labeled per manufacturer instructions.**

APPENDIX F-3
Home Care Guidelines for Infection Control.

1. If smallpox patients are housed in their own homes, at a minimum, perform the following decontamination procedures:

a. Bag and dispose of trash according to routine waste disposal methods for your community.

b. Launder bedding, linens, clothing, curtains, or other cloth material that came into contact with the smallpox patient in hot water, adding one cup of bleach per load. Dry laundry in a hot dryer, if possible.

c. Clean surfaces, furniture, fixtures, and walls thoroughly with a household disinfectant (e.g., Lysol), following manufacturer's recommendations.

d. Clean carpets and upholstery using an EPA-approved germicidal detergent, following manufacturer's recommendations.

2. Private Vehicles, if used to move the patient while infectious. Decontaminate using an EPA-approved germicidal detergent or HAD per manufacturer's recommendations

a. Bag and incinerate all disposable items in the vehicle.

b. Wipe down all surfaces in the vehicle thoroughly with a detergent per manufacturer's recommendations. Allow the solution to remain on the surfaces for at least 20 minutes before being removed.

c. Clean carpets and upholstery using detergent per manufacturer's recommendations. Allow the solution to remain on the carpets and upholstery for at least 20 minutes before being wiped off. Allow cloth upholstery to completely dry before use.

d. Clean all outside door handles thoroughly using a detergent per manufacturer's recommendations. Allow the solution to remain on the door handles for at least 20 minutes before being wiped off.

e. Launder cloth material used to wipe down the inside of the vehicle using hot water (71ºC) and bleach, or bagged and incinerated (see above).

APPENDIX F-4
Disinfecting Environmental Surfaces in Healthcare Facilities.

1. Healthcare Infection Control Practices Advisory Committee (HICPAC) Guideline for Disinfection and Sterilization in Healthcare Facilities, 2002, provides recommendations with the ultimate goal of reducing rates of healthcare-associated infections through the appropriate use of disinfectants and sterilization processes. Each recommendation is categorized on the basis of existing scientific data, theoretical rationale, and applicability. The CDC system for categorizing recommendations is as follows.

2. Rankings.

a. Category IA. Strongly recommended for implementation and strongly supported by well-designed experimental, clinical, or epidemiologic studies.

b. Category IB. Strongly recommended for implementation and supported by some experimental, clinical, or epidemiologic studies and a strong theoretical rationale.

c. Category IC. Required by state or federal regulations. Because of state differences, readers should not assume that the absence of an IC recommendation implies absence of state regulations.

d. Category II. Suggested for implementation and supported by suggestive clinical or epidemiologic studies or a theoretical rationale.

e. No recommendation. Unresolved issue. Practices for which insufficient evidence or no consensus regarding efficacy exists.

3. Category IB.

a. Use a one-step process and an Environmental Protection Agency (EPA)-registered hospital-grade disinfectant or detergent (“hospital-approved disinfectant,” HAD) designed for housekeeping purposes.

b. Clean housekeeping surfaces (e.g., floors, wall, tabletops) on a regular basis, as spills occur, and when visibly soiled.

c. The frequency for environmental surface disinfection should comply with hospital policies and should minimally be done when visibly soiled and on a regular basis (e.g., daily, three times per week).

d. Follow manufacturers’ instructions for proper use of disinfecting products, especially the recommended concentration.

e. Prepare disinfecting solutions as needed and replace with fresh solution frequently (e.g., floor mopping solution every three patient rooms or changed no longer than 60-minute intervals) according to the facility's policy.

f. Wet-dust horizontal surfaces regularly (e.g., daily, three times per week) using clean cloths moistened with a HAD. Prepare the disinfectant as recommended by the manufacturer.

g. Decontaminate mop heads and cleaning cloths regularly to prevent contamination (e.g., launder at least daily and heat dry).

h. Phenolic disinfectants (i.e., those containing phenol-based compounds) should not be used to clean infant bassinets and incubators during the stay of an infant. If phenolics are used to terminally clean infant bassinets and incubators, the surfaces should be rinsed thoroughly with water and dried before the infant bassinets and incubators are reused.

i. If chlorine solution is not prepared fresh daily, chlorine may be stored for up to 30 days in a capped plastic bottle with a 50% reduction in chlorine concentration over 30 days (e.g., 1000 ppm chlorine at day 0 decreases to 500 ppm chlorine by day 30).

j. For site decontamination of spills of blood or other potentially infectious materials (OPIM), use protective gloves and other personal protective equipment (PPE) appropriate for this task. If sodium hypochlorite solutions are selected use a 1:100 dilution (i.e., 500 ppm available chlorine) to decontaminate nonporous surfaces after cleaning a small spill of either blood or OPIM. If a spill involves large amounts (e.g., > 10 ml) of blood or OPIM, use a 1:10 dilution for the first application of HAD disinfectant before cleaning.

4. Category IC.

a. Promptly clean and decontaminate spills of blood or other potentially infectious materials.

b. Occupational Safety and Health Administration (OSHA) requires that blood spills be disinfected using a HAD or a solution of 6% sodium hypochlorite (household bleach) diluted between 1:10 and 1:100 with water. A HAD that is labeled effective against human immunodeficiency virus (HIV) and hepatitis B virus (HBV) would be considered an appropriate disinfectant provided the surfaces have not been contaminated with agent(s) or volumes of or concentrations of agent(s) for which higher-level disinfection is recommended.

5. Category II.

a. In units with high endemic *Clostridium difficile* infection rates or in an outbreak setting, the use of dilute solutions of 6% sodium hypochlorite (1:10 dilution of bleach) can be used for routine environmental disinfection.

b. Clean walls, blinds, and window curtains in patient-care areas when visibly contaminated or soiled.

c. Do not use high-level disinfectants/liquid chemical sterilants for disinfection of non-critical surfaces.

d. The contact time for low-level disinfection of non-critical items is at least 30 seconds.

6. Disinfection in Ambulatory Care and Home Care.

a. The same classification scheme described above should be followed (i.e., critical devices require sterilization, semi critical devices require high-level disinfection, and non-critical equipment requires low-level disinfection) in the ambulatory care (e.g., outpatient medical or surgical facilities) setting since there is a similar infection risk as in the hospital setting. Category IB

b. Reusable objects that touch mucous membranes (e.g., tracheostomy tubes) can be cleaned and disinfected by immersion in a 1:50 dilution of 6% sodium hypochlorite (household bleach) for 3 minutes, 70% isopropyl alcohol for 5 minutes, or 3% hydrogen peroxide for 30 minutes, because the home environment should be safer to the extent that person-to-person transmission is less likely. Category II

c. Non-critical items (e.g., crutches, blood pressure cuffs) in the home setting can be cleaned with a detergent. Category II.

APPENDIX F-5
Glossary of Decontamination Terms.

Bleach: Household bleach (6% to 6.15% sodium hypochlorite) is normally diluted in water at 1:10 or 1:100 (i.e., 1 part concentrated bleach to 10 or 100 parts water). Approximate dilutions are 1.5 cups of bleach in a gallon of water for a 1:10 dilution (6,000 ppm) and one-quarter cup of bleach in a gallon of water for a 1:100 dilution (600 ppm).

Cleaning: The removal, usually with detergent and water or enzymatic detergent and water, of adherent visible soil, blood, protein substances, and other debris from the surfaces, crevices, serrations, joints, and lumens of instruments, devices, and equipment by a manual or mechanical process that prepares the items for safe handling and/or further decontamination.

Contact time: The time a disinfectant is in direct contact with the surface or item to be disinfected. For surface disinfection, this time period is framed by the application to the surface until complete drying has occurred.

Contaminated: State of having been actually or potentially in contact with microorganisms. As used in healthcare, the term generally refers to the presence of microorganisms that could be capable of producing disease or infection.

Decontamination: A procedure that removes pathogenic microorganisms from objects so they are safe to handle.

Detergent: A cleaning agent that makes no antimicrobial claims on the label. They are composed of a hydrophilic component and a lipophilic component and can be divided into four types: anionic, cationic, amphoteric, and non-ionic detergents.

Disinfectant: An agent that frees from infection, usually a chemical agent but sometimes a physical one, that destroys disease-causing pathogens or other harmful microbes, but may not kill bacterial spores. It refers to substances applied to inanimate objects. The EPA groups disinfectants on whether the product label claims “limited,” “general,” or “hospital” disinfection.

Disinfection: Disinfection describes a process that eliminates many or all-pathogenic microorganisms on inanimate objects with the exception of bacterial spores. Disinfection is usually accomplished by the use of liquid chemicals. The efficacy of disinfection is affected by a number of factors, each of which may nullify or limit the efficacy of the process. These include the prior cleaning of the object; the organic and inorganic load present; the type and level of microbial contamination; the concentration of and exposure time to the germicide; the nature of the object (e.g., crevices, hinges, and lumens); the presence of biofilms; the temperature and pH of the disinfection process.

Germicide: An agent that can kill microorganisms, particularly pathogenic organisms ("germs"). It is like the word disinfectant with the difference that germicide applies to compounds used on both living tissue and inanimate objects, whereas disinfectants are applied only to inanimate objects.

Hospital disinfectant: A disinfectant registered for use in hospitals, clinics, dental offices, or any other medical-related facility. Efficacy is demonstrated against *Salmonella choleraesui*s, *Staphylococcus aureu*s, and *Pseudomonas aeruginosa.* EPA has registered about 1,200 hospital disinfectants.

Hospital-approved disinfectant (HAD): HAD disinfectants labeled as tuberculocidal approved by the healthcare facility.

Regulated Medical Waste: Liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially-infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially-infectious materials. Any waste defined by federal, state and local regulations capable of producing an infectious disease in humans.

Sterilization: The complete elimination or destruction of all forms of microbial life, accomplished in healthcare facilities by either physical or chemical processes. Steam under pressure, dry heat, ethylene oxide (ETO) gas, hydrogen peroxide gas plasma, and liquid chemicals are the principal sterilizing agents used in healthcare facilities.